Space Weather Forecast

Issued on Monday, 20 November 2023 at 01:10 Local

This forecast provides a four-day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Increasing Chance of R1 minor radio blackouts. Risk of G1 minor geomagnetic storms peaking at start and middle of UTC working week.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity declined to low in the UTC day of Sunday 19 November, with the largest flare of the period an upper-end Common class from a sunspot in the southeast at 19/0834UTC.

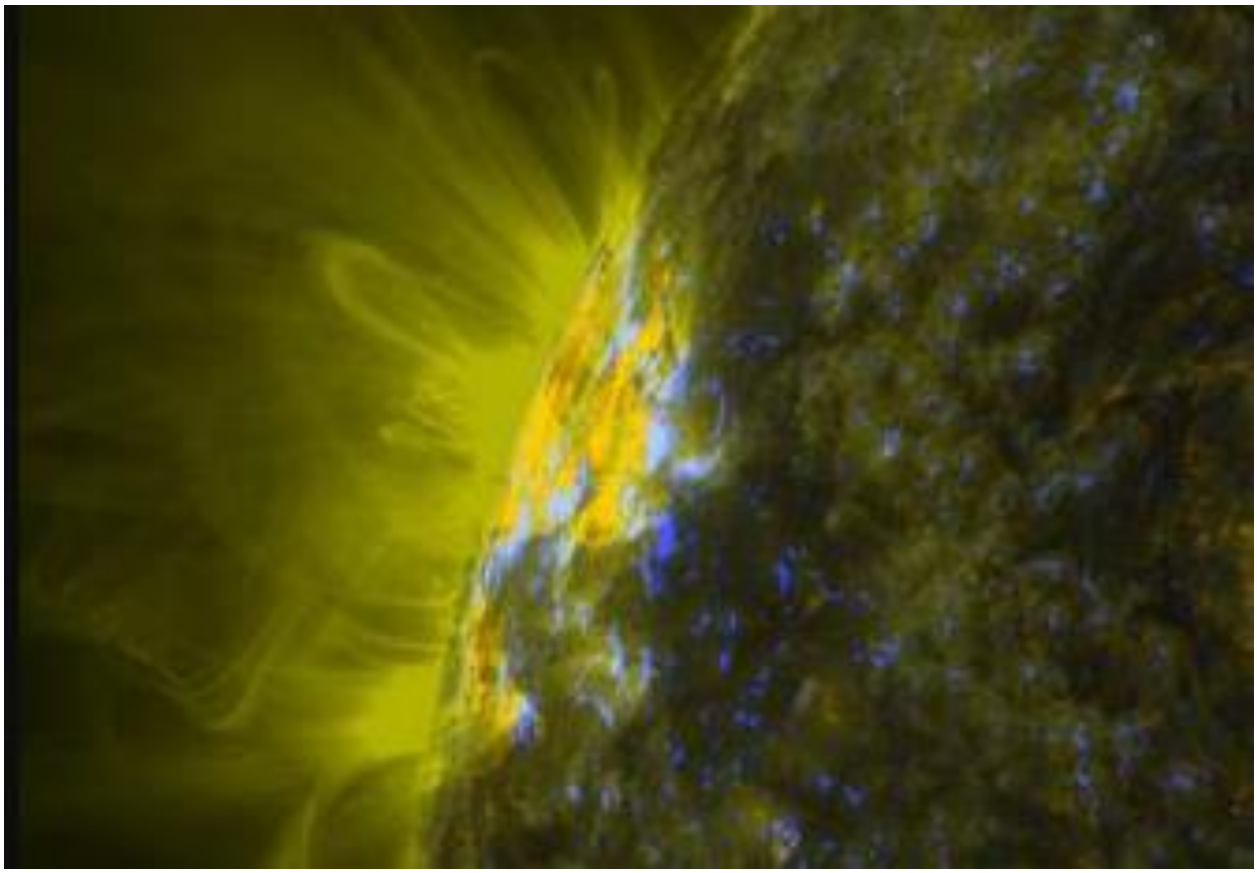

Figure 1: Extreme UV satellite imagery showing magnetic polarities and flux loops from large arriving sunspot regions in the northeast from 19/2400UTC.

There are now at least three sunspot regions on the facing side of the Sun. The most active group (in the southeast) showed a continuing tendency towards proliferation and areal growth of its intermediate regions, but at the expense of its fading trailing spots.

While the aforementioned region was the most active group in the period, this was somewhat

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against expectations given the presence of a far larger and hitherto more active sunspot region in the northeast. Its large span both vertically and horizontally on the disc may yet be subdivided as further rotation reveals more detail and the links between its constituent parts.

Numerous 'filament' and 'prominence' eruptions were apparent on imagery in the period, although the vast majority appeared far-sided or else emanated from the edges of the solar disc. The one possible exception to this trend that was noted was a small emerging and then erupting filament near S20E030 around 19/0200UTC, from a very similar source to an earlier filament 18/1600UTC. Both have been modelled and are considered to pass below and behind the track of the Earth in its orbit to no effect. No new Earth-directed CMEs were therefore in evidence.

Solar Wind / Geomagnetic Activity: Solar winds have followed a varying slow regime in the past 24 hours. The solar wind speed rose and fell slightly, all while remaining within its background range. The number of particles and associated magnetic field was within typical background levels. The net result of the above solar wind measures was for provisionally quiet geomagnetic activity throughout.

Energetic Particles / Solar Radiation: No solar radiation storms were observed.

Four-Day Space Weather Forecast Summary

Solar Activity: There is a daily chance of Moderate-class X-ray flares from current eastern solar horizon sunspot regions, perhaps rising slightly as a result of a further arrival over the southeastern solar horizon that is now becoming visible.

Solar Wind / Geomagnetic Activity: There is one CME in the current forecast - the central 'filament eruption' from 16/0100UTC. This is due within the first 12 hours of the forecast, bringing a slight chance of a G1/Minor Geomagnetic Storm. Activity is expected to otherwise be mostly quiet until the anticipated onset of a fast solar wind regime on Wednesday 22 November, which may see a slightly greater chance of generating G1.

Energetic Particles / Solar Radiation: No solar radiation storms are expected.

Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	20	5	30	5
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

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Radio Blackouts - X Ray Flares:

X Ray Flares	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability			(%)	(%)	(%)	(%)
Active	R1-R2 M Class	No	40	50	50	50
Very Active	R3 to R5 X	No	5	5	5	5

Solar Radiation Storms - (High Energy Protons):

Radiation Storms	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability (Exceedance)			(%)	(%)	(%)	(%)
Active	≥ S1	No	5	5	5	5
Very Active	≥ S3 *	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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